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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/835,115	04/13/2001	Michael J. Daneman	ONX-115B	4735

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EXAMINER
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CULBERT, ROBERTS P

ART UNIT	PAPER NUMBER
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1763

9

DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/835,115

Applicant(s)

DANEMAN ET AL.

Examiner

Roberts Culbert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 2/4/03 have been fully considered but they are not persuasive.

Applicant has argued that the prior art references do not show etching the *backside* of the base as stated in claim 1. However applicant has not shown that the prior art references do not show etching the backside of a base. The applicant has not shown that there is any difference between the front side and backside of a wafer with a vertical crystal orientation. The argument that the prior art references do not show processes on both sides of the wafer is irrelevant because the claimed invention does not recite any limitation that indicates front-side processing (i.e. a two sided process). All of the process steps recited in claim 1 occur on the same side of a substrate as in the prior art references. The process appears to be the same regardless of which side is called the front or back, top or bottom. The invention of claim 1 does not define over that of MacDonald and Shaw.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1,2,4,5,6 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,770,465 to MacDonald et al. MacDonald et al. discloses a method for forming a microstructure starting with a single crystal silicon substrate base (10) (Col.3 Lines 52-53). A trench (14) is anisotropically etched in the substrate base (10) (Col. 3 Lines 65-67). A first insulating oxide layer (16) is formed on the wafer (Col.4 Lines 8-10). A second layer (18) is used to cover the oxide layer (16) and fill the trench (14)

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(Col. 4 Lines 14-17). The trench filling material may be a metal conducting layer (Col. 2 Lines 19-23). A portion of the base material adjacent to the trench (14) is removed by etching (Col. 11 Lines 35-37).

Referring to Figure 11d, the trench (262) is further defined under a flap (276).

Claims 1, 5, 6, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,719,073 to Shaw et al. Shaw et al. discloses a method for forming an isolated electrode starting with a single crystal silicon substrate base (10) (Col. 8 Lines 55-56). Trenches (22) are anisotropically etched in the substrate base (10) (Col. 9 Lines 60-65). An insulating oxide (28) is formed on the wafer (Col. 10 Lines 60-63). A conducting layer (44) is formed over the oxide layer covering both the sidewalls and the surface of the base (Col. 12 Lines 22-25). A portion of the base material adjacent to the trenches (22) is removed by etching (Col. 11 Lines 35-37).

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over MacDonald et al. in view of U.S. Patent 6,074,890 to Yao et al. MacDonald et al. discloses the invention substantially as claimed, but does not use an etch stop layer to etch the trench in the base. Yao et al. teaches the use of an etch stop layer for etching a substrate (Col. 5 Lines 58-59). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the etch stop layer taught by Yao et al. during the preliminary etching step of MacDonald et al. in order to define the depth of the trench.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. in view of U.S. Patent 6,074,890 to Yao et al. As applied above, Shaw et al. discloses the invention substantially as claimed, but does not define the trench under a flap. Yao et al. teaches the formation of

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a trench under a flap (Col. 7 Lines 16-18) in order to make an electromechanical device. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Shaw et al. under a suspended flap in order to form an electromechanical structure in the manner illustrated by Yao et al.

Regarding claim 3, Shaw et al. discloses the invention substantially as claimed, but does not use an etch stop layer to etch the trench in the base. Yao et al. teaches the use of an etch stop layer for etching a substrate (Col.5 Lines 58-59). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the etch stop layer taught by Yao et al. during the preliminary etching step of Shaw et al. in order to define the depth of the trench.

Furthermore, regarding the use of etch stop layers, it is notoriously old and well known in the silicon etching art that etch stop layers will stop an etch at a predetermined level. Since the purpose of the preliminary step in Shaw et al. is to etch a trench to a specified level, and etch stop layers are known in the art to facilitate this purpose, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply an etch stop layer to the substrate during the preliminary etching step of Shaw et al. to define the depth of the trench, in the well-known manner.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. as applied to claim 1 above, and further in view of U.S. Patent 6,121,552 to Brosnihan et al. As applied above, Shaw et al. discloses the invention substantially as claimed, but does not fill the trench completely with the conducting layer. Brosnihan et al. discloses a method for making an electromechanical device by forming an isolated electrode (Col.1 Lines 65-67) and (Col. 2 lines 1-6). Brosnihan et al. teaches covering the sidewall of a trench (18) with an insulating layer (64) (Col.6 Lines 26-31) and subsequently filling the trench with a conductor (66) (Col.6 Lines 38-42). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to completely fill the trench of Shaw et al. as shown by Brosnihan et al. in order to form an isolated electrode.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over MacDonald et al. as applied to claims 1, 2, 4, 5, 6 and 7 above and further in view of U.S. Patent 5,960,255 to Bartha et al. As applied above, MacDonald et al. discloses the invention substantially as claimed, but does not teach

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the orientation of the crystal base and sidewall. Bartha et al. teaches the use of a single crystal material that has a <110> surface orientation (Col.4 Lines 25-27). Bartha et al. shows that the vertical trenches are therefore parallel to the <111> planes (Col.4 Lines 36-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to etch the trench of MacDonald et al. using the crystal orientation shown by Bartha et al. in order to form a trench with straight and parallel sides that form a 90° angle with the base.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw et al. as applied to claims 1, 5, 6 and 7 above and further in view of U.S. Patent 5,960,255 to Bartha et al. As applied above, Shaw et al. discloses the invention substantially as claimed, but does not teach the orientation of the crystal base and sidewall. Bartha et al. teaches the use of a single crystal material that has a <110> surface orientation (Col.4 Lines 25-27). Bartha et al. shows that the vertical trenches are therefore parallel to the <111> planes (Col.4 Lines 36-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to etch the trench of Shaw et al. using the crystal orientation shown by Bartha et al. in order to form a trench with straight and parallel sides that form a 90° angle with the base.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberts Culbert whose telephone number is (703) 305-7965. The examiner can normally be reached on Monday-Friday (7:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

February 19, 2003



**SHRIVE P. BECK**  
**SUPERVISORY PATENT EXAMINER**  
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